Oil palm genetic orange spotting (205)

Photo 1. Spots of genetic orange spotting on leaflets of increasing age, left to right, caused by *Oil palm orange spotting viroid.*

Photo 2. Genetic orange spotting on oil palm., caused by *Oil palm orange spotting viroid.*

Common Name

Oil palm genetic orange spotting

Scientific Name

Oil palm orange spotting viroid, and its abbreviation is OOSVd. A viroid is a length of RNA, much smaller than the RNA of the smallest virus, and without a protein coat. OOSVd is closely related to a viroid in the Philippines, *Coconut cadang-cadang viroid* (CCCVd), which causes a lethal disease in coconuts and other palms.

Distribution

Widespread. Genetic orange spotting occurs wherever oil palms are grown, including West Africa, Central America, Indonesia, Malaysia, Papua New Guinea, Solomon Islands and Thailand.

Hosts

Oil palm. Note, in the Philippines a viroid disease of coconuts caused by *Coconut cadang-cadang viroid*, is naturally spread to oil palm and several other palm species, and a number of understorey plants, especially monocotyledons. However, molecular analysis of the viroid associated with genetic orange spotting has shown that it is slightly different compared to *Coconut cadang-cadang viroid*.

Symptoms & Life Cycle

Symptoms show as numerous bright orange spots, 2-3 mm diameter, on all except the youngest three to four fronds (Photos 1&2). Palms are stunted, yellow-orange, and bunches and nuts are reduced in size and number.

At one time, orange spotting on the leaves of oil palm was thought to be 'genetic', i.e., passed from parents to seed. The reason for this was (i) it was associated with certain types of oil palm only, (ii) it did not seem to be a nutritional problem, and (iii) the spots did not lead to decay like those caused by fungi, bacteria or some viruses.

Analysis of palms in Solomon Islands found that viroids were present in those with orange spots on the leaves and that these were related to viroids found in coconuts infected with cadang-cadang viroid (CCCVd) in the Philippines. CCCVd causes a gradual decline in palms over 20-30 years, usually starting when they begin to flower.

Tests in the Philippines have shown that CCCVd infects oil palm and the viroid in oil palms infects coconuts, and in both cases the inoculations cause typical symptoms of cadang-cadang and genetic orange spotting.

Cadang-cadang disease spreads relatively slowly over an area, affecting about 1% of the palms each year, but it is not known how this spread occurs. The CCCVd palms are not in groups, and no insect, fungus, bacterium or virus has been found to cause new infections. However, some viroid-infected palms can be found 500 m ahead of the disease front suggesting airborne spread.

Spread of the viroid in oil palm plantations occurs in seed with, perhaps, secondary spread during harvests when fruit bunches and fronds are removed. There is also a possibility that weevils introduced for pollination transmit the viroid. Spread in pollen is known to occur in other viroid diseases, e.g., avocado sunblotch.

Impact

Palms with *Oil palm orange spotting viroid* are stunted, and the yield of nuts is about 50% of that from adjacent trees that appear healthy. Usually, the number of palms showing symptoms is low, but there are examples reported where 1-2% of oil palms show symptoms after 3 years, presumably from seedborne infections. Overall, it appears to be a disease of minor importance.

Detection & inspection

Look for stunted palms with orange spots on the leaves. However, it is possible for palms to be infected with the viroid but without symptoms. To overcome problems of detection, molecular tests are needed to provide proof of viroid presence.

Management

There are no methods of treating oil palms once they are infected, but it is important that they are removed from the plantation as soon as they are diagnosed, as there is evidence that the viroid may spread from them to adjacent healthy palms.

However, this recommendation may be of limited use, because (i) early diagnosis is difficult, and (ii) there is evidence that the viroid may be present in oil palms without showing symptoms, acting as a reservoir of viroid for spread during harvesting or pollination. If this is so, removing only those with symptoms of orange spotting may be of little value.

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